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ABSTRACT

This curriculum guide, designed to facilitate nutrition education in grades 4 through 6, can be used as a basis for curriculum development at the school district level or as a basis for teachers' daily lesson planning. Curriculum materials are prefaced by a list of nutrition concepts and understandings, an objectives-based grade placement chart, and 41 suggestions for evaluating learner comprehension. Materials focus on foods and civilizations, food selection and societies, how the body uses food, energy foods, and foods for growth. The guide is arranged by topic, subtopic, terminal objectives, enabling objectives, learner activities and teacher information. The topics and subtopics provide the teacher with a means for identifying the desired broad area of nutrition. The learner activities are intended to assist pupils in achieving the enabling objectives. Finally the teacher information section provides the teacher with information needed to facilitate the implementation of the learner activities. A list of books and related resources plus a chart of the nutritive value of some foods are appended.
 (Author/RH)

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HEALTH EDUCATION PHYSICAL DIMENSION OF HEALTH

NUTRITION EDUCATION GRADES 4-6

PS 011322

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PREFACE

How to Use this Curriculum Guide

This guide is designed to facilitate nutrition education in two ways:

1. The guide can be used as a *basis* for curriculum development at the school district level. The school district curriculum development committee should select those topics, objectives and learner activities that are most consistent with local nutrition resources, needs and interests. *These should be further expanded or modified in accordance with learner needs and developmental levels.* They can also be arranged in sequential and progressive order to eliminate unnecessary duplication and to avoid gaps in learning from one grade to the next.
2. The guide can be used by teachers as a *basis* for daily lesson planning. Topics, objectives and learning experiences should be selected by the teacher (and perhaps by the learners) that are most appropriate for the group of learners. Appropriateness should be determined by the learners' abilities, needs and interests.

The guide is arranged by topic, subtopic, terminal objectives, enabling objectives, learner activities and teacher information. The topics and subtopics provide the teacher with a means for identifying the desired broad area of nutrition. The *terminal objective* indicates the goal to be achieved, while the *enabling objectives* identify the stepping stones for achieving the terminal objective. The learner activities are intended to assist the learners in achieving the enabling objectives. Finally, the teacher information section provides the teacher with information needed to facilitate the implementation of the learner activities. Teachers are urged to review the *Teachers' Manual* prior to or in conjunction with lesson planning. See Appendix A, P.108 of the *Teachers' Manual* for sources of assistance in planning and teaching about nutrition.

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Many elementary school teachers and secondary school health educators were also consulted, especially in regard to the application of the guide to the education process within schools.

The entire project was under the direction and supervision of Albert E. Bedworth, Associate in School Health Education, the Bureau of School Health Education and Services, the State Education Department, who also edited the manuscript and prepared it for publication.

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MESSAGE TO TEACHERS

One of the keys to success in nutrition education is provision for learner-centered, active learning rather than teacher-centered, passive learning. *It is important that many opportunities to explore, discover, and experience about foods be provided.* Learning experiences should be directed toward assisting learners to understand the relationship between food and their own health and growth and to recognize the value of using objective criteria for selecting food. It is also important for learners to develop the concept that the food people eat is an integral part of physical and sociocultural environments. Teachers should take advantage of the numerous opportunities to integrate science, social studies, language arts and other areas of the curriculum into nutrition education. Whenever possible, learning experiences with foods should be placed within the broader areas of learning, but especially within the context of real life situations.

Beginning on page 2 of this guide there is a list of the major concepts and understandings that learners should develop as a result of their nutrition experiences during the intermediate grades. A grade placement for activities is provided on page 3. Activities in this summary are related to the appropriate learner objectives. A review of these will provide the teacher with a basis for planning and for avoiding unnecessary duplication from one grade to the next.

Appendix A provides a listing of a number of books for children that have food as the primary subject. These can be used to expand the learners' knowledge of food and their language arts skills. There are several learning experiences which involve the school food services, which can become the major laboratory for nutrition education and can put other class activities within the context of the school's food programs.

Prior to planning and teaching about nutrition, it will be helpful to review certain sections of the *Teachers' Manual*. For an overview of nutrition education for the intermediate grades and a listing of teacher goals, see pages 13 to 15 of the *Teachers' Manual*. Other references to the *Teachers' Manual* are made prefatorily to teaching each topic in this guide.

NUTRITION CONCEPTS AND UNDERSTANDINGS

The development of sound nutrition concepts is important for formulating attitudes, establishing values and clarifying beliefs. Concepts are developed as a result of learning experiences. The more realistic the learning experience is the more likely that meaningful concepts will be developed. The development of nutritional concepts is the foundation upon which nutritional attitudes are established and nutritional values clarified. The chief nutritional concepts and understandings are:

- o Many factors determine what foods people eat.
- o Many different food patterns supply the same essential nutrients.
- o Wherever people have managed to survive, they have found food which would supply at least the minimum nutrients necessary for survival.
- o All people must have enough food for energy, and foods which supply protein, vitamins and minerals.
- o Family and individual eating patterns are the results of a complex of personal and sociocultural factors.
- o Our bodies use nutrients from food for energy, growth, and maintenance.
- o Each cell of the body has a need for specific nutrients.
- o Nutrients are delivered to the cells of the body by the circulatory system after being derived from food by the process of digestion and entering the circulation by the process of absorption.
- o The cells of the body change nutrients into energy and into building materials for the body.
- o The body's need is for nutrients, not for specific foods.
- o Food plays an important role in growth and development.
- o Each person has his or her own pattern of growth which is determined by heredity.
- o Adequate nutrition is essential for an individual to achieve his or her growth potential.
- o Overweight or underweight may result from too much or too little food in relation to needs for growth and energy.
- o There are some criteria we can use to aid us in selecting food to meet our needs.
- o The basic four food groups offer one general guide for what kinds of foods we need to eat.
- o Individual needs and concerns will influence our choice of specific foods.
- o Knowledge of the relationship between nutrition and health gives us the basis to select foods that will provide the nutrients we need.
- o Food has always been an important factor in the history of humanity.
- o The success with which people have been able to obtain adequate food has influenced their ability to devote energy to accomplishing other tasks.
- o The need for food has influenced wars, revolutions, patterns of settlement and exploration, and other important events in human history.
- o Nutritional labeling helps consumers determine the nutritional quality of foods they buy.
- o Advertising is a means of promoting the sale of foods which we may or may not need.
- o Some substances ingested by people, such as beverage alcohol, do not contribute to the nutritional requirements of the body.
- o Nutrient density is a way of relating nutrient content to calories in a given food and can be used as a guide for food selection.

GRADE PLACEMENT FOR LEARNER ACTIVITIES RELATED TO OBJECTIVES

<u>Learner Objectives</u>	<u>Suggested Grade for Activities</u>		
The learner is able to:	<u>Fourth</u>	<u>Fifth</u>	<u>Sixth</u>
o describe the importance of the beginning of agriculture to people's nutrition.	1,2	1,2	
o describe the contribution grains make to people's nutrition.	5	4,8	3,6,7
o cite examples of how food production has political as well as personal significance.	15	9,12	10,11,14
o relate food waste to the economy, energy used, land use, and hunger.		18	18,19
o identify several situations where food is vital to survival.	16,22,23	17,22,23	20,24,27,28
o describe the cultural origin of some foods.	31,32,33	29,32,33	30,32,33
o describe how the availability of foods influences one's food choices.		34	34,35
o relate food practices with socioeconomic status.	37	36	36
o list several experiences that influence his/her food choices.	38,43	39,43	40,41,42,43
o describe how the four food groups can be used as a guide for food selection.	44,45,46	48	47,49
o describe how food is processed by the body after ingestion.	50,51,52	54,55,56	
o describe the structure and function of body cells		57,58,59,60,61	62,63,64,65
o relate how certain nutrients are essential for certain body cells and tissues.	72	66,68	67,69,70,71
o explain the purpose of water in the body and how we get it from foods.	73	74	75
o explain why food can provide all the nutrients people need.	76,77		77,78,79,80
o explain the importance of energy food and the amounts required.		81,83	82,83,84,85
o identify by testing which foods contain starch and fat.		86,87	88,89,90
o show the relationship of heredity and nutrition to growth.	91,96,97,98,101	91,94,102,103	91,92,93,95,99,100
o describe the importance of protein in the diet.	104,105,106	104,105,106	104,105,106

NOTE: The suggested grade for each activity is intended as a guide for planning. With slight alterations many activities can be made appropriate for other developmental levels, either younger or older. The above numbers correspond to the number of the activity as listed in the Guide.

SUGGESTIONS FOR EVALUATING LEARNER COMPREHENSION

Introduction

Evaluation should be directly related to the achievement of learner objectives. There may be one or several evaluative items associated with each objective. This allows for some flexibility in evaluating the depth of comprehension. Also, the actual method for implementing each evaluative device can be altered by the teacher for the most useful results. For example, to the evaluative device, "Have the learners state the functions of nutrients in the body," the learner could respond orally, in written form, or by identifying nutrient functions with a matching test item.

The suggestions below are intended as evaluative devices for use with learners at the termination of their nutrition experiences during the intermediate grades. The results should indicate the basic nutrition competencies developed by each learner. Selected evaluative items may also be used for evaluating learners in each of the intermediate grades. The information should provide teachers with an indication of the progress each learner is making from one grade to the next. For each evaluative item the grade in which it should be used is indicated. It will be noted that some items are appropriate for more than one grade depending upon when teachers decide to implement certain experiences that will result in achievement by the learners.

Suggested Evaluative Devices

Evaluative Device	Grade for Use		
	Fourth	Fifth	Sixth
1. Provide the learners with cutouts or pictures of foods. Have them identify those that are rich sources of energy.		X	X
2. Have the learners describe how vitamins and minerals contribute to growth.			X
3. Have the learners state the function of protein as a nutrient.		X	X
4. Have the learners list three consequences to a person who does not get the proper amounts of the essential nutrients.			X
5. Provide the learners with a list or pictures of a variety of foods. Have them identify those that are rich protein sources.	X	X	X
6. Have the learners state the functions of nutrients in the body.		X	X
7. Have the learners make up two or three different meals that are essentially equal in nutritive values.			X

Suggested Evaluative Devices

Evaluative Device	Grade for Use		
	Fourth	Fifth	Sixth
8. Provide the learners with pictures or cutouts of many foods. Have them place each food within the proper group according to the Basic Four Food Groups.		X	
9. Using the four seasons of the year, have the learners list foods that are abundant in each season.		X	
10. Have the learners make up meals for a week that reflect a balanced diet.			X
11. Have the learners explain why foods have been placed into four food groups.		X	
12. Have the learners develop food selection criteria based upon accurate nutritional knowledge.			X
13. Have the learners identify at least three psychological factors that influence one's nutritional behavior.			X
14. Have the learners state how one's cultural heritage influences his or her eating behavior.	X	X	X
15. Have the learners describe how one's cultural heritage influences the way in which foods are prepared.	X	X	X
16. Have the learners make a list of foods that were eaten by Native American Indians prior to the arrival of the Europeans.	X		
17. Have the learners state why certain foods are commonly eaten in various cultures.		X	
18. Have the learners state how one's food likes and dislikes influence his or her food choices.	X		
19. True or false: The foods one selects are influenced by one's past experiences, what the family eats, what is available and customs.			X
20. True or false: One's food choices are influenced by food advertisements.			X

Evaluative Device

Grades for Use

	Fourth	Fifth	Sixth
21. Have the learners name three foods people eat because of religious influences.			X
22. Have the learners make a list of so-called "junk foods" and state why people eat them.		X	X
23. Have the learners make a table listing the immediate and long-term effects of poor eating patterns.			X
24. Have the learners list five superstitions or misconceptions about foods and state how they were formed.		X	X
25. Have the learners list several essential nutrients and state the consequences to the body if each is lacking in the diet.			X
26. True or false: Eating too much food can result in obesity. Explain.		X	
27. True or false: Eating too little food can affect one's rate of growth. Explain.			X
28. Have the learners show how their food habits have changed over the past few years. Have them explain why.		X	
29. Have the learners describe how both heredity and nutrition affect one's growth. Have them list other factors that can affect growth.	X	X	X
30. Have the learners describe why the digestive process is important for proper nutrition.		X	
31. Provide learners with a diagram of a cell and have them explain how nutrients reach and enter the cell.		X	
32. Provide the learners with a listing or illustrations of several body parts; e.g., tooth. Have them indicate which nutrients are necessary for the health of each part.			X

Evaluative Device	Grades for Use		
	Fourth	Fifth	Sixth
33. Have the learners distinguish between absorption and assimilation.			X
34. Have the learners describe how cells change nutrients into energy and building materials.			X
35. Provide the learners with a list or illustrations of several different body cells. Have them indicate the function of each in the body.	X		
36. Have the learners explain why food and water are essential for proper cell function.	X		
37. Have the learners relate the health of cells to the health of the person.		X	
38. Have the learners list the nutrients that cells need for proper function.		X	
39. Have the learners explain why certain tissues and organs need a higher concentration of some nutrients.		X	X
40. Have the learners explain why the beginning of agriculture was important for people's nutrition.	X	X	
41. Have the learners describe why the invention of farm machinery has changed the production of the world's food.			X

TEACHING/LEARNING STRATEGIES

TOPIC

FOOD AND CIVILIZATIONS

SUB-TOPICS

BEGINNING OF AGRICULTURE

IMPORTANCE OF GRAINS

EXPANSION OF CIVILIZATION

FOOD WASTE

TERMINAL OBJECTIVE

To appreciate the historical significance of food to the development of civilization.

ENABLING OBJECTIVES

The learner is able to:

1. describe the importance of the beginnings of agriculture to people's nutrition.
2. describe the contribution that grains make to people's nutrition.
3. cite examples of how food production has political, as well as personal, significance.
4. relate food waste to the economy, energy use, land, and hunger.

BASIC FACTUAL INFORMATION

Much of the information in this section can be taught in conjunction with social studies experiences. Review the discussions on pages 26-27, and 29 of the *Teachers' Manual*. The learners should acquire an understanding of the following:

- o The importance of agriculture and how it has expanded.
- o The kinds of nutrients that grains provide and the importance of these nutrients.
- o The social, economic and political significance of foods on people and societies.
- o The implications of food waste to the economy, energy, land use and hunger.

TOPIC: Food and Civilizations

SUB-TOPIC: Beginning of Agriculture

TERMINAL OBJECTIVE: *To appreciate the historical significance of food to the development of civilization.*

ENABLING OBJECTIVE: *The learner is able to describe the importance of the beginning of agriculture to people's nutrition.*

LEARNER ACTIVITIES

1. Make a bulletin board display that illustrates primitive people and the kinds of food they ate.
 - o How varied were their diets?
 - o How did primitive people obtain their food?
 - o How did primitive people eat?
 - o How did primitive people prepare their food?
 - o What kinds of weapons did primitive people devise in order to trap and kill animals for food?
 - o What kinds of nutrition problems existed for primitive people?
 - o What common nutrition problem exists in the United States today but probably did not in prehistoric times?
 - o What conditions had to exist before people were able to begin to develop agriculture and to produce food for themselves?
2. A second class display could be developed showing pictures of farms and farm machinery today. Discuss with the class the contrast between the two displays as regards the way we do it now.
 - o Did primitive people share foods? Why or why not?
 - o Were primitive people generally assured of a good supply? Why or why not?
 - o Where and when did agriculture begin?
 - o What changes in the diets of people took place as a result of agriculture?

TEACHER INFORMATION

If pictures are not available, the pupils could make drawings of primitive peoples based upon their perceptions from past learning experiences in social studies. Books on world history may provide the pupils with the background they need to develop the display. Perhaps some pupils have visited museums that had displays of primitive people and the way they lived.

A companion study could be conducted. Have some learners visit a supermarket and make a list of foods that probably were not available even 30 or 40 years ago. These will include the many prepared foods such as T.V. dinners, soybean preparations and concentrated, frozen fruit juices. It is estimated that between 3,000 and 6,000 food items are available in the average supermarket, depending upon its size and location.

Although the world's population is much larger today than in primitive times our food supply is also larger and people generally could have enough food. One of the chief factors related to a scarcity of food in some areas is inadequate food distribution.

Better seed, improved agricultural techniques, fertilizers, farm machinery, and breeding of livestock has increased the amount of food that can be produced per acre as well as the amount that each person can produce.

- o Why was agriculture important in relation to the people's food supply?
- o Why was grain the chief crop grown?
- o What has made it possible for us to be able to feed increasing populations?

It is probably desirable that each nation approach as nearly as possible self-sufficiency in regard to their own food supply. As with most essentials of life, it could be dangerous to depend upon only one or two sources for basic commodities. The raising of crops and livestock for food supplies is dependent to a great extent upon the weather. Unfavorable weather conditions could destroy a whole crop, creating a famine. However, if food supplies are available from a number of sources, this may more readily be averted in times of crisis.

SUB-TOPIC: Importance of Grains

ENABLING OBJECTIVE: *The learner is able to describe the contribution that grains make to people's nutrition.*

LEARNER ACTIVITIES	TEACHER INFORMATION
3. Using a map of the world as a background, have the class develop a display showing the growing of grain crops throughout the world. Small flags of various colors could be made to represent different grains; e.g., white-rice, yellow-wheat and so on. 4. Have the pupils bring to class as many different kinds of grains and breads as they can. Identify each type of grain, the kind of food made from it, and the part of the world where it is grown and eaten. Make a chart or other kind of bulletin board display of grains and the kinds of foods made from them. - o Which grains do most of the pupils like best? Why? - o Which foods that are made from grains are most popular? - o Which grain foods are most nutritious? If possible, make tortillas or other unleavened bread. - o In what forms besides bread do we eat grains? List these on the chalkboard. 5. Conduct a bread-tasting party.	Obtain a copy of <i>Food News---World Food Situation</i> from the Office of the Dairy Council. (See Appendix A, p.108, of the <i>Teachers' Manual</i>.) The pupils should bring the label of each kind of bread to class. Comparisons of these labels can make an interesting discussion about the nutrients in bread. If pupils can find the price of each bread, comparison of cost with the nutritive value of the bread can be made. Be sure to take into account the weight of the various breads. (See also, Appendix C of this guide.) The school food services director or the home economics department may be able to assist with this activity. Cut the slices of bread into eighths or bite-size pieces so that each pupil can try a number of different ones.

6. Survey the class to determine how many pupils and how often they eat grains in the forms listed in activity number 4.
 - o What nutritional contributions do grains make to people's diets?
 - o Are grain foods relatively inexpensive forms of these nutrients?
7. Have the pupils give short oral reports about the grains that they brought to class.
8. Discuss that during the Middle Ages there was very little activity in art, the sciences, music and literature.
 - o Were the frequent famines during this period connected in any way with this lack of scientific and cultural activity? Why or why not?
 - o Why were agricultural practices poor during the Middle Ages?

It may be valuable to bring in discussions about the enrichment of many foods made from the various grains. Why are some grain foods enriched? Which grain foods are not enriched? How does a lack of enrichment of some grain foods affect their nutritive value?

These discussions can be tied in with other discussions related to social studies.

Some of the famines could have been relieved to some extent if some cultural inhibitions could have been overcome. For example, the French people refused to eat potatoes which were quite plentiful.

SUB-TOPIC: Expansion of Civilization

ENABLING OBJECTIVE: *The learner is able to cite examples of how food production has political, as well as personal significance.*

LEARNER ACTIVITIES	TEACHER INFORMATION
9. If one person can produce enough food for twenty people, what kinds of things can the other nineteen people do? List some on the chalkboard. 10. ASK: How does the farmer contribute to the nation's economy? 11. Have a debate on: "Civilization depends upon people's ability to produce food efficiently." - o How much do we depend upon effective storage of foods? Effective preservation of foods? - o How much does our food supply depend upon our system of transportation? - o How many of the pupil's parents are engaged in food-producing occupations? - o How many are engaged in occupations where foods are related? (Example: grocery store or restaurant) 12. Discuss why about 3/4 of the labor force of developing nations are engaged in food production. - o How does this affect the nation's economy? - o How does it affect the people's standard of living?	Some basic principles of economics can be introduced based on this concept. It might be interesting to make a list of occupations that depend upon food production. Examples are food packers, truckers, storage industries, metal industries, printing and related industries, cabinet making, and builders. Discuss also some industries that are indirectly or partially dependent upon food production; for example, electric and gas companies, telephone, etc. Some key issues that may be brought out include the overall health of people, the ability to work more efficiently when adequately fed, the mental and social factors related to good nutrition. Storage, preservation and transportation make it possible for people to obtain a wider selection of foods during all of the seasons of the year. Contrast the pupils' parents' occupations related to food production with that of the people in developing nations. Generally, about 3/4 of the labor force in developing nations are engaged in food production occupations. Some important concepts can be discussed related to technology---farm machinery and equipment, genetics related to seeds and livestock.

13. Trace the role of food supply during the American Civil War.

- o Why was the Northern blockade of Southern ports effective in helping to win the war?
- o Did the fact that the South produced cotton as its major agricultural crop contribute to its defeat? Explain.

14. Relate food supplies to today's military and with space travel.

15. Discuss, in conjunction with social studies, the rationing of food in the United States during World War II.

- o Was it necessary?
- o How successful was it?
- o How widespread was the black market?
- o How well did people, generally, accept the rationing of food?
- o Why did some people hoard certain foods?

16. Have pupils research the history books and encyclopedia for accounts of such events as the Russian Revolution, French Revolution, World Wars I and II, the Great Depression, and the Nigeria-Biafra War.

- o How frequently is food mentioned?
- o What relation did these major events have to the food supply?
- o Is it true that a nation that depends on foreign trade to supply its food is more vulnerable politically than one that can produce its own food? Justify the responses.

Noteworthy is the cotton crop of southern states. Since most of the land was planted to cotton and other nonfood products, the southern states had to depend upon the importation of much of their food.

Feeding large military forces and the civilian population during wartime is an enormous undertaking.

17. Discuss the role of food supply in the expansion of the Westward frontier in the United States. Include effects on both the pioneers and on the Native American Indians.

Below is a suggested vocabulary list for this section.

<i>Prehistoric</i>	<i>mechanization</i>	<i>food supply</i>
<i>agriculture</i>	<i>leavened bread</i>	<i>blockade</i>
<i>food producers</i>	<i>tortillas</i>	<i>spice</i>
<i>cultivation</i>	<i>cassava</i>	<i>famine</i>
<i>food processing</i>	<i>matzoh</i>	<i>scurvy</i>
<i>unleavened bread</i>	<i>protein</i>	<i>vitamin C</i>
<i>ferment</i>	<i>B vitamins</i>	<i>ascorbic acid</i>
<i>staple food</i>	<i>iron</i>	<i>"Limey"</i>

SUB-TOPIC: Food Waste

ENABLING OBJECTIVE: The learner is able to relate food waste to the economy, energy use, land, and hunger

LEARNER ACTIVITIES	TEACHER INFORMATION
18. Invite the school food service director to class to discuss food waste in the school cafeteria. Some questions that may be asked are: - o Is there excessive food waste in the cafeteria? - o What kinds of foods are most frequently discarded? -fruits? -milk or other beverages? -vegetables (raw or cooked)? -meat? -sandwiches? which kinds? -desserts? -salads? - o Have any studies been conducted to determine why some foods are discarded? If so, what are the results? - o When it is found that a particular food item is discarded by many pupils, are attempts made to find out why? - o Are these foods served again even though many pupils discard them? - o What might the pupils do to reduce food waste in the cafeteria?	Prior to introducing this topic, obtain a copy of: Mapes, Martha and Stewart, Barbara, <i>Food Waste As an Individual Concern</i>, Division of Nutrition Sciences, Cornell University, 1979. This is available through your County Cooperative Extension Office, or the Division of Nutrition Sciences, Cornell University, Ithaca, N.Y. 14853. (See also Appendix B of this guide.) Studies have shown that pupils discard whole sandwiches, fruits, and vegetables. Nearly one-fifth of the milk is discarded. This is in addition to the usual edible plate wastes. Perhaps the class, in cooperation with the school food service director, could conduct a study of food waste in your school. If such a study is undertaken, it will need to be carefully planned in advance and should include such factors as the purpose of the study, methods for collecting data (measuring the food waste, identifying the kinds of food, etc.), and how the data will be used (especially in terms of reducing this waste).

19. Discuss the significance of food waste in the United States. Emphasize the following points:

- o In what ways does food waste also affect our energy waste?
- o How does food waste affect our economy?
- o Why is it important to reduce food waste in the school, home, restaurants?
- o Is food waste in the United States related to world hunger? Explain.

Information from the source cited above indicates that:

- o nearly three-quarters of the solid waste in the world is generated in the United States.
- o About 10 percent of the food purchased is wasted.
- o A two-person household wastes about \$100 worth of food per year. (With the increase in food prices in recent years, this figure is probably much higher today.)
- o Food availability could be about 15 percent greater if waste from farmer to consumer were reduced.
- o More than \$4.5 billion are spent each year for disposing of urban wastes. (This includes all waste including food.)
- o 16.5 percent of our total energy expenditure is for food; an additional 12 percent is expended in municipal waste disposal.

TOPIC

Food Selection and Societies

SUB-TOPICS

FOOD AND WORLD EXPLORATIONS

CULTURAL INFLUENCE

AVAILABILITY OF FOODS

SOCIOECONOMIC STATUS

PERSONAL EXPERIENCES

CRITERIA

TERMINAL OBJECTIVE

To realize that food practices of a country or region evolve from many complex factors.

ENABLING OBJECTIVES

The learner is able to:

1. describe how the need for food has influenced world explorations.
2. describe the cultural origin of some foods and its influence on food selection.
3. describe how the availability of foods influences one's food choices.
4. relate food practices with socioeconomic status.
5. list several experiences that influence his/her food choices.
6. describe how the four food groups can be used as a guide for food selection.

BASIC FACTUAL INFORMATION

Review the discussions presented on pages 29-30, 32-34, 56-58 of the *Teachers' Manual*. The learners should acquire an understanding of the following:

- o *How the need for adequate food supplies has influenced world explorations.*
- o *How food choices are influenced by one's psychological make-up, culture, socioeconomic status and personal experiences with foods.*
- o *The meaning of the basic four food groups and how they can be used in ensuring an adequate diet.*
- o *The meaning of nutrient density of foods and how to use this in determining an adequate diet.*

TOPIC: Food Selection and Societies

SUB-TOPIC: Food and World Explorations

TERMINAL OBJECTIVE: *To realize that food practices of a country or region evolve from many complex factors.*

ENABLING OBJECTIVE: *The learner is able to describe how the need for food has influenced world explorations.*

LEARNER ACTIVITIES	TEACHER INFORMATION
20. On a map of the world trace the routes of the early spice traders, of Vasco de Gama and of Columbus. - o Compare the length of time the men had to spend aboard their ships at that time with today. - o What kinds of foods and in what quantities did these explorers need to take with them? Compare food storage then with that of a modern ocean liner. 21. Have the pupils list the names of several spices brought to class. Identify the place of origin of each spice. - o How does the spice smell? Taste? Is it a pleasant taste? - o Can pupils identify some foods they have eaten that contain the spice? How many different dishes can the class list for each? - o Which spices are the pupils most familiar with? - o What is the chief purpose of spice as a food?	The historical situations given as examples in this section are intended only as illustrations of the basic role that food plays as a motivating factor and as a political tool. Other instances can easily be found in the study of history and contemporary events. Provide the opportunity for students to see, taste and smell a variety of spices. Spice containers have listed on the label where in the world they come from. Some leading spice producers will be able to provide charts of spices and their common uses. Some supermarkets and specialty stores dealing in spices may also be a source of information. Caution: Some spices (pepper) may be irritating. Take care when pupils smell the spices that some doesn't get into the nostrils.

22. Discuss: Even during a time of real famine, the French people, generally, would not eat corn (maize).

- o Why are people sometimes reluctant to try different foods or foods with which they are not familiar?
- o Can the pupils cite examples in their own lives where they would not change some of their eating practices?
- o What differences are there today in making changes that were not present one or two hundred years ago?
 - How has the development of new foods affected our eating behavior?
 - How do food advertisements influence the foods we eat?

23. Let the pupils do some individual reading about Columbus' voyage to discover why scurvy was not a problem.

24. Discuss: None of Columbus' men died from scurvy during their voyage across the Atlantic Ocean. Why?

Corn was eventually adopted as a food by some people of Southern Europe. However, many Europeans never were willing to even try it. This is an example of the strength of food habits. A people for whom wheat bread had been the staple food for centuries was not interested in eating a different food.

Some of our attitudes about foods that others eat may be negative. These are frequently acquired from conversations or observations of others, especially parents or other close relatives, who have developed a dislike or who themselves are reluctant to try something different. However, today, as a result of T.V. and other sources, we learn about many unusual foods. (See pages 45-47 of the guide for grades K-3) (Activity 42 of this guide is related to this and may be done in conjunction with this activity.)

They will find that Columbus and his crews sailed from Lisbon on September 6, 1492. The reason they did not develop scurvy was that the voyage was not long enough for healthy men to become ill or to die from vitamin deficiency. This may be a good time also to introduce the concept that symptoms of nutrient deficiencies generally take some time to appear. (See page 60 of the *Teachers' Manual*.)

You may want to combine some of these experiences with social studies by discussing some of the early explorers to America. Include in the discussion how these explorers often ran out of fresh fruits and vegetables during their long voyage across the ocean and what effect the lack of these foods had on their health. Ask the class to list some of the new foods the explorers discovered such as corn and squash. (See pages 29-30 of the *Teachers' Manual*.)

25. Compare Columbus' voyage with that of Vasco de Gama's.

- o How were the sea voyages similar?
- o How did they differ?
- o What were the outcomes of the two voyages?
- o Why did Vasco de Gama lose most of his crew to scurvy?

26. Discuss:

- o How are preparations for space travel in regard to feeding the astronauts similar to those of long sea voyages two or three hundred years ago?
- o In what ways are arrangements for feeding people on long voyages, such as space travel, different today from two or three hundred years ago?
- o What kinds of feeding problems have been overcome?

27. Have the class observe the methods of serving school lunches in the school cafeteria.

- o How is the food prepared?
- o Are lunches that are provided nutritious?
- o How can school lunch programs be improved?
- o Are a variety of foods prepared so that students can have a choice of foods?

28. Have the pupils analyze the types of nutrients required to determine whether these lunches are nutritious.

- o Do the pupils eat all parts of the school lunches?
- o Do the pupils think the school lunches are tasty? Attractive?

Some interesting, historical accounts of space travel may be found in news articles during the late 1960's and early 1970's, or from books that describe this era. Mention can be made of modern methods of preserving foods; e.g. refrigeration; canning; dehydration. Also, we know much more about human nutrition needs and are able to prepare relatively nutritious diets for long trips into space or around the world.

Involve the school food services manager in this aspect of the discussion. There are frequently many comments about school lunches, some of which are not complimentary. Perhaps the school food services director would like to explain how school lunches are planned and served. The discussion can include some of the limits placed upon the school's lunch services; regulations, financing (other costs), equipment, personnel and their training. It might be important to emphasize that school food services is essentially a cooperative effort of many people and that the pupils are a part of this cooperative effort. In what ways can pupils cooperate with the school food services to ensure nutritional lunches that are tasty and attractive?

- o What do the pupils suggest would improve the school lunches?
- o Do pupils generally eat the lunches or are major portions wasted? Why?

29. If possible, visit an airport kitchen to observe how meals are prepared for airplane passengers. Compare with the procedures used by the school food services.

30. If possible, visit a hospital or other large institution to observe how meals are prepared.

- o Who determines what is to be prepared and how it is prepared?
- o What experience and/or training does this person have in nutrition?
- o What basic factors are taken into account when determining what is to be prepared and how it is served?

See also activities numbers 18 and 19.

Point out the role of the dietician, diet aid, means of transporting food from the kitchen to the patients, methods of serving and other problems that face large institutions.

SUB-TOPIC: Cultural Influence

ENABLING OBJECTIVE: *The learner is able to describe the cultural origin of some foods and its influence on food selection.*

LEARNER ACTIVITIES	TEACHER INFORMATION
31. Have each pupil choose a country and find out all they can about the kinds of foods its people eat. - o Make comparisons among three or four countries. - o What importance do the people place on food socially, for maintenance of life, or politically? - o Are the people of the country generally well-nourished? - o What problems exist in the country relative to food supplies, and to nutrition? - o Compare two countries that are close together but from two continents. - o What effects have rapid means of communication and transportation had on eating customs and on dietary changes of countries? 32. Have the class plan a "United Nations Lunch" for which members of the class can, in small groups, research what people eat in several countries. Plan a lunch menu or menus as appropriate.	This can be implemented as a part of a general social studies report. In this case, the role of food could be treated more broadly; i.e., the effect of the food supply on the political, economic and social way of life of the country. It might be interesting to discuss why or how certain foods are more customary in one country than another. Take into account climate and other agricultural factors, trade, economy and the like. For example, corn, turkey, fish, squash, pumpkin, berries, venison, quail, and pheasant are foods that are frequently found in the diets of Americans. Most of these also are foods that the Native American Indians ate. Therefore, our diets include a combination of European and American Indian foods primarily. In the past 75 to 100 years, Oriental foods have also become popular. The climate of the United States is such that a wide variety of fruits, vegetables and grains can be grown. Also, a variety of animals are raised to provide meat, eggs, and milk. Relate the recent establishment of Coca Cola, for example, in Mainland China. Determine whether one of the menus planned can be served as a part of the regular school lunch program. The pupils may want to observe how this lunch is received by the rest of the pupils in the school.

33. Through discussion, list on the chalkboard the foods eaten in the United States that the American Indians ate prior to the coming of the Europeans.

34. List some of the foods that are eaten in the United States that were brought from other countries. List some foods that were developed since the establishment of the United States.

- o Do all Americans eat the same foods?
- o What are ethnic foods?
- o What differences exist among groups in the United States in the food they eat?
- o Are there any foods that all Americans eat?

A trip to the supermarket may reveal more explicitly the varieties of foods that are already prepared. Have the class examine the labels of some prepared foods; e.g., chili, stew, T.V. dinners, for food nutrients they contain.

35. Have the pupils examine their own eating patterns.
- o Compare with others in their family. Are there similarities? Why?
 - o Where do many of our eating practices originate?
 - o Compare with their peers. Are there similarities?
 - o What can be concluded from these comparisons?

Corn and squash will most likely lead the list. Be sure to mention the varieties of wildlife such as deer and buffalo and the varieties of plants, especially fruits such as berries, that were eaten by the American Indians. Discuss also the life-styles---some were chiefly agricultural, others hunters. The American streams and rivers were also rich sources of fish.

It might be interesting to identify and discuss some of the special kinds of foods Americans eat; for example, New England clam chowder and Manhattan clam chowder, Soul food, Mexican food, Oriental food, Italian food, and Polish food. This shows the importance of cultural influences in regard to the wide variety of foods eaten in this country.

Students in small groups can find out about a particular food through library research and through resource persons. Simple foods may be prepared by the pupils in order to taste them. More elaborate dishes perhaps could be prepared in cooperation with the school food services, the home economics department or by mothers.

Many of our eating patterns are established early in life through family food practices. As we grow older and expand our social environment, peer influences come into play. Also, food advertisements are strong influences of some of the foods we eat.

SUB-TOPIC: Availability of Foods

ENABLING OBJECTIVE: *The learner is able to describe how the availability of foods influences one's food choices.*

LEARNER ACTIVITIES	TEACHER INFORMATION
36. Identify foods that are more available and/or less expensive during the summer months than in the winter. Study foods in several parts of the world. Give a test in which the pupils must circle the one food out of three or four that doesn't belong in the diet of the specified country; i.e., the food that is unavailable or not eaten there. 37. Assign each pupil a foreign country or a part of the United States. Pose the problem: If they were to open a food store in the assigned area, what would be sold? Have each pupil research the problem and make a short report to class.	Generally, although not always, fresh fruits and vegetables are less expensive during the harvest season. People will select foods that are available to them, that they can afford, and they are accustomed to and like. A pupil might indicate that he or she would not open a store in a given area because the people all grow their own food. Obtain the booklet <i>Animals That Give People Milk</i>. The booklet is available from the office of the Dairy Council. (See Appendix A, p.108 of the <i>Teachers' Manual</i>) The booklet presents milk animals of the United States and the world. There is included a historical discussion of the cow, how she makes milk and the importance of milk as a food.

SUB-TOPIC: Socio-economic Status

ENABLING OBJECTIVE: *The learner is able to relate food practices with socio-economic status.*

LEARNER ACTIVITIES	TEACHER INFORMATION
38. Divide the class into several groups. Give each group several newspaper grocery ads and a specified amount of pretend money. Each group should have a different amount of money. Each group is to "shop" with their money for one day's food for a family of four. Each group is to report to the class what they "bought." 39. Using a fictitious family, discuss: - o what each member of the family eats. - o whether what each member eats is the same or is different from what the rest eats and why. - o whether what the family eats is similar to or different from that which other families in the community eat. - o in which ways what the family eats is similar to or different from what people in another country eat.	This activity uses a hypothetical shopping trip to avoid directly talking about families' differing economic resources which might be embarrassing to some pupils. Create a fictitious family with the needs of the pupils and the nature of the community in mind. Describe the family to the class. In a class where several ethnic backgrounds are represented, study several families to bring out similarities and differences in their food choices and ways they are prepared.

SUB-TOPIC: Personal Experiences

ENABLING OBJECTIVE: *The learner is able to list several experiences that influence their food choices.*

LEARNER ACTIVITIES	TEACHER INFORMATION
40. Discuss the influence of school lunch on the pupil's food habits. - o Do you now eat any foods that you did not before trying them in the school lunch? - o Do you eat foods at school that you don't eat at home? 41. Discuss the effects on a family's food habits from moving from one part of the country to another. Perhaps some of the pupils have first-hand experiences that they can share with the class. 42. Have the pupils search for food advertisements on television, in the newspaper, and in magazines. - o How many of the products advertised do the pupils eat? - o Do advertisements influence what we eat? Why? How? - o Do advertisements influence which foods the family purchases? Why? - o What are the food advertisements really telling people?	The director of school food services may want to be involved in this kind of discussion. The director may be able to add some points for discussion based upon what the pupils eat at lunch, plate waste, and the like. List these in two columns on the chalkboard labeled: "School lunch influences" and "School lunch choices". Popular foods in various regions of the United States reflect the nationalities of early settlers---Florida Spaniards, for example. Also, the kinds of agriculture carried on because of the soil, climate, etc., will influence popular foods in a region. The pupils should recognize the different techniques or appeals used for different products and for different audiences. A bulletin board display may be used to illustrate representative advertisements. Some pupils may be able to describe how a food advertisement influenced them to try a particular product. (See also pages 45-47 of the K-3 guide) (Refer back to activity 22 of this guide)

43. Have pupils report to class on how various religions use food in their rituals or how the rules affect the food intake of the people belonging to the religion.

- o Make a bulletin board display as appropriate.
- o Have some pupils make posters that represent these religious concepts.

44. Have the pupils identify beliefs and superstitions about food in their own environment. List on the chalkboard for further discussion:

- o Compare food beliefs of the pupils with those of elderly relatives.
- o Evaluate the beliefs listed.
 - Are they true?
 - How can we be sure?
 - Where do they originate?
 - Do they have some remote basis in fact?

45. Discuss the key terms used during this part of the pupil's nutrition experiences.

- o Use the terms in a variety of ways, but especially as they apply to nutrition.
- o Write the terms on the board.
- o Have the pupils learn to spell them.

Divide the class into three or four groups and have each group research the religious practices as they relate to food practices. For example, almost all religions have a prayer or ritual for giving thanks for food. Collect these prayers for the bulletin board display. Discuss the significance of food and religion.

Note: It may be necessary to obtain approval from your principal before doing this activity.

Obtain a copy of the film, "Science and Superstition" from Coronet Films, or from Cornell University Film Library, Roberts Hall, Ithaca, N.Y. 14853. (There is a small rental fee.) The film runs for 10 minutes and provides an introduction for distinguishing between science and superstitions about food.

Some common examples of food fallacies are:

- fish is a brain food.
- orange juice and milk should not be eaten together.
- garlic will make your blood pure.
- tomatoes cause cancer.
- honey will cure diseases.
- wheat germ gives vigor and vitality.
- grapefruit burns fat.

(See also Appendix B, p.111 of the Teachers' Manual)

The nutrition experiences should also add to the pupils' vocabulary. Some of the key terms used in this section are:

availability
beliefs
customs
energy
habits

minerals
vitamins
protein
cultural
superstition

SUB-TOPIC: Criteria

ENABLING OBJECTIVE: *The learner is able to describe how the four food groups can be used as a guide for food selection.*

LEARNER ACTIVITIES	TEACHER INFORMATION
46. Discuss the four food groups. - o What are the four food groups? - o Do these groups provide us with basic and sound criteria for selecting nutritious foods? - o What serving sizes for each group are recommended? 47. Using food models, have the pupils sort foods into the four food groups. 48. Have pupils keep a record of their food intake for two or three days. Classify foods eaten into the food groups. Evaluate the adequacy of the diet on the basis of the food groups. - o What about the foods that are not in the four groups? 49. Have the pupils plan a day's diet for individuals with special concerns as follows: - o Someone allergic to citrus fruit - o Someone whose religion forbids eating beef or pork - o Someone who has no stove - o Someone who has no refrigerator - o Someone who does not have time to cook.	<i>See How Your Body Uses Food," "Source of Nutrients," p. 20 for related experiences. Obtain from the office of the Dairy Council posters illustrating the four food groups. (See Appendix A, p. 108 of the Teachers' Manual.)</i> Food models are available from the office of the Dairy Council. (See Appendix A, p. 108 of the Teachers' Manual.) Be sure that pupils take into consideration serving sizes as well as the specific food. There is a fifth food group which consists chiefly of those foods that contain nothing more than "empty calories." Because of the varieties of foods available to us, it is still possible to receive an adequate diet. For example, persons who are allergic to citrus can still get their vitamin C from cabbage, tomatoes or potatoes and other fruits and vegetables.

50. Evaluate the pupils' knowledge of the basic food groups. Present them with a list of foods that a child might eat in a day. Make the list of foods void of one group of foods. Have the pupils suggest snacks that would make the day's menu adequate.

51. Have the class plan a menu for the school lunch for a day. The class should develop a way to publicize to others that they planned the menu and which day it is to be served. Records of the numbers of pupils eating the lunch and of the plate waste should be kept. Compare with an average day.

This could also be done with several small groups of students with each group analyzing a menu lacking in a different food group. For example, the following sample is lacking in the bread and cereal group:

3 glasses of milk
chopped beef patty
cottage cheese
glass of orange juice
an apple
carrot sticks
peas
tossed salad

This should be a cooperative effort between the class and the director of food services. The director of food services could discuss the requirements for a type A lunch and interpret any restrictions placed on the foods to be served so that the menu planned by the class could be served in the cafeteria. Using the technique of voting on disagreements, a group decision process can be used. This also reinforces the learnings about accepting foods even though they are not favorites.

TOPIC

HOW THE BODY USES FOOD

SUB-TOPICS

DIGESTION AND ABSORPTION

CELLS AND THEIR NEED FOR NUTRIENTS

WATER IS ESSENTIAL

SOURCE OF NUTRIENTS

TERMINAL OBJECTIVE

To comprehend how the body receives and uses nutrients.

ENABLING OBJECTIVES

The learner is able to:

1. describe how food is processed by the body after ingestion.
2. describe the structure and function of body cells.
3. explain the purpose of water in the body.
4. explain why food can provide all the nutrients people need.

BASIC FACTUAL INFORMATION

Review the discussions on pages 37, and 47-50 of the *Teachers' Manual*. The learners should acquire an understanding of the following:

- o *How the body digests and absorbs food and nutrients and the importance of this to health.*
- o *The various cells that make up the body and their need for specific nutrients.*
- o *The role that water plays in proper nutrition.*
- o *The sources of the various nutrients and the recommended daily allowances needed to ensure proper health.*

TOPIC: How the Body Uses Food

SUB-TOPIC: Digestion and Absorption

TERMINAL OBJECTIVE: *To comprehend how the body receives and uses nutrients.*

ENABLING OBJECTIVE: *The learner is able to describe how food is processed by the body after ingestion.*

LEARNER ACTIVITIES	TEACHER INFORMATION
52. On a large picture or a flannelboard representation of the human gastrointestinal system, demonstrate the path that food takes in the body. 53. On a diagram of the gastrointestinal system, have the pupils label each major part, learning how to spell the correct names. 54. Have pupils cut out and put together the structures of the gastrointestinal system. 55. Discuss this statement: The gastrointestinal system is a hollow pipe going through the body. 56. Illustrate that peristaltic action forces food along the gastrointestinal system regardless of gravity by showing that one can swallow uphill. 57. Discuss the significance that this has for space travel. - o What was the problem related to serving food in space? - o How was this problem solved?	The chief structures of the gastrointestinal system are the mouth, esophagus, stomach, small intestine and large intestine. It may be effective to discuss the chief functions of each of these structures in relation to digestion and absorption. Distribute to each pupil a dittoed sheet containing simplified drawings of the chief structures of the gastrointestinal system that are arranged randomly on the page and unconnected. Although this statement is basically true, the pupils should understand that there are many stops along the way and that the food we eat undergoes radical changes through the process of digestion. These changes are necessary before the body can make use of the nutrients contained in the foods. A student can stand on his or her head with feet against the wall for steadiness and drink water, milk or juice through a straw. Since in space there is no gravitational force, scientists would have had to develop some way for astronauts to eat. However, since the human ability to swallow does not depend upon gravity this posed no problem for space travel. One problem related to eating in space that needed to be dealt with was the serving of food. Without gravity, it is not possible to serve foods on a plate, in a cup or glass because the food would simply float away.

SUB-TOPIC: Cells and Their Need for Nutrients

ENABLING OBJECTIVE: *The learner is able to describe the structure and function of body cells.*

LEARNER ACTIVITIES	TEACHER INFORMATION
58. Have the pupils cut an onion in half. Peel off an inside layer. On the outside of this layer they will find a transparent skin that is very thin. Have them pull off a small piece of this skin and place it in a drop of water on a glass slide. Flatten the tissue out with a toothpick and cover with a cover glass. 59. Have the pupils look at the cells through the low-power lens of the microscope. - o How do the cells fit together? - o Are nuclei present? Why? - o What do the cells look like?	Use an informal pretest to ascertain the pupils' level of understanding of cells. Select activities that are most likely to build upon the pupil's present knowledge. A simple way of mounting the onion skin is to drop a small piece in a dish or bowl of water, place the slide under the skin and lift the slide. The onion skin will be mounted on the slide. Cover with a cover glass. Materials needed for this activity are: onion(s), knife, compound microscope(s), toothpicks, glass slides, cover glasses, eye dropper, iodine. (See Appendix B of this guide for supplementary resources) <i>Note: Methylene blue or ink may be used in place of iodine. Caution the children to handle these with care, they can stain clothing and iodine is poison.</i> Although not all of the nuclei will show up because of the thickness of the cell, some should be visible. The cells should appear like bricks in a wall; each "brick" is a cell. Each cell should contain a dark spot inside it. This is the nucleus of the cell. If it is removed or destroyed, the cell will die.

60. Have the pupils change to the high-power lens.

- o What new things have become visible?
- o Is the nucleus of the cell present?
- o Is the cell membrane visible?
- o Is the cell wall visible?
- o What would happen to the cell if the nucleus were removed?
- o Why was the use of iodine necessary?

61. Have the pupils examine animal cells and compare these with the plant cells already observed. Pupils should examine the material under the low power lens of the microscope first, then with the high power lens.

- o What do you see?
- o Are the cells of the cheek different from the cells of the onion?
- o Is a nucleus present?
- o Is there a cell membrane? A cell wall?

62. Draw pictures of the two kinds of cells observed under the microscope.

- o Label the parts of each.
- o How do they compare?

Each cell also has two thin lines around the outside. The inner line is the cell membrane while the outer one is the cell wall.

Note: If enough microscopes for pupil use are not available, it may be possible to obtain a microprojector from the science department so that all pupils can observe the demonstration at the same time.

To obtain human cells, have the pupils scrape the inside of their cheek or lip with a toothpick, scrape some of the white material on the toothpick into a drop of water that has been placed on a glass slide. Have them spread the material out in the water, add a drop of iodine, and place a cover glass over it.

The pictures could be drawn one on each half of a sheet of paper with the labels in the middle. The parts that should be labeled are the cell wall (onion cell only), cell membrane and nucleus. Have the pupils compare animal cells with plant cells. The animal cells do not contain a cell wall, only the cell membrane.

For additional information and activities about cells see Health Education: Cancer Prevention and Control, Curriculum Guide, Grades 4,5, and 6, pp 1-4 and appendices 1,2, and 3.

63. Pictures of many body cells may be used so that pupils can become familiar with a variety of human cells.

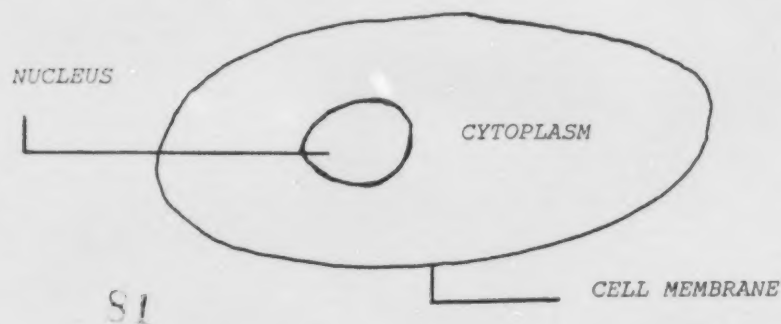
- o Do you think that your bone cells would look different from those of your cheek?
- o Are all tissues of the body made up of cells? Explain.
- o Have a small group of pupils research the elementary school health textbooks and make drawings of the various body cells pictured in them. Use these for a class display.

64. Have the pupils make cell models. Have the pupils identify the parts of the "cell."

The parts of the cell that pupils should be familiar with are:

- o the cell membrane
- o the cell nucleus
- o the cell cytoplasm

Diagram of a typical cell



65. Draw a picture of a typical cell. Label its parts.

Most elementary school health textbooks have pictures or diagrams of human cells: epithelial, bone, nerve, and muscle.

Materials needed are unflavored gelatin, cornstarch, several small plastic bags (sandwich size), string, scissors, and modeling clay.

Mix a teaspoonful of starch with a packet of gelatin. Add $\frac{1}{2}$ cup of cold water; let set a few minutes. Slowly add 1 cup of boiling water, stirring to dissolve the ingredients. Cool slightly. Pour some into a plastic bag (an amount about the size of a ping pong ball.) Add a small piece of clay to represent the nucleus. Tie the bag tightly so it has the shape of a ball. There should be as little air as possible. Cut away the unused part of the bag. Let it cool and harden overnight. The plastic bag represents the cell membrane.

66. How can we demonstrate that large molecules cannot cross the cell membrane while small ones can? Describe what has taken place.

- o Was there a change in both "cells"? Why? Why not?
- o What caused the change?
- o What can be concluded?

67. Conduct an experiment to discover the purpose of calcium. Place a chicken bone in a jar and cover it with vinegar. Leave it for several days, examining it at intervals.

- o What did the vinegar (acid) remove from the bones?
- o What does the calcium do for bones?
- o Why didn't the entire bone dissolve?
- o Do bones contain protein? Can vinegar dissolve protein? Try it with a protein food.
- o Is there more than one kind of cell in bone?

68. Pupils can do this project at home, bringing in their chicken bones when they think that they have changed.

- o Who needs the most calcium, children or adults? Why?
- o Who needs the least calcium?
- o What are some rich sources of calcium? of vitamin D?

Materials needed are the gelatin cell models, iodine, clear bowls or jars, and water. This can be conducted as a class demonstration or with several pupils doing the experiment. Fill two jars about 3/4 full with warm water. Add enough iodine to one jar of water to turn it a light tan. Place a gelatin "cell" in each jar of water. Let them stand overnight. The gelatin solution in the jar with the iodine will turn a light blue; there will be no change in the other.

The iodine must have reached the inside of the bag. Therefore, it must have passed through the membrane. The water outside the membrane did not turn blue; therefore starch could not pass through the membrane.

Help the pupils to discover what calcium does in bones. Materials needed are clean chicken bones, vinegar or diluted hydrochloric acid, and wide-mouth jars.

Note: If hydrochloric acid is used instead of vinegar, special techniques will have to be used; e.g., handling the bones with tongs.

After a few days, the bones will become pliable and will bend easily.

The acid (vinegar) has dissolved the calcium. Explain that vinegar we eat, as in salad dressing, does not have this same effect on the bones in our body since they do not soak in what we eat.

(See Appendix C of this guide of nutritive value of foods.)

69. Have each pupil check a box of salt at home.

- o Does it say "iodized" on the label?
- o What is the purpose of iodine?
- o What kind of nutrient is iodine?

70. Make a tally of how many pupils use iodized salt at home and how many do not.

- o Besides iodized salt, what other foods contain iodine?

71. Invite a dentist to class to discuss with the pupils the importance of good nutrition to dental health. Have the dentist include a discussion of fluoride and how it helps to prevent dental caries.

72. Have pupils bring labels or boxes from bread and cereal products. From these find out the names of the B vitamins.

- o Are other nutrients listed?
- o What are they? Are they essential?
- o Can we obtain them from other sources?
- o Why is vitamin B important?

73. Discuss: If there were no citrus fruits available, how would people get their vitamin C?

Iodine is a mineral that we need in trace amounts. A lack of iodine in the diet can result in goiter. Iodine is necessary for proper functioning of the thyroid gland.

It may also be of interest to compare the price of iodized and noniodized salt.

Obtain the poster "Have a Happy, Healthy Smile" from the office of the Dairy Council. (See Appendix A, p.108 of the *Teachers' Manual*) (See also the New York State curriculum guide for dental and oral health). For more detailed dental health information contact the office of the Dairy Council, or the County Unit of the American Dental Association.

Obtain from the office of the Dairy Council a copy of *The Great Vitamin Mystery*. (See Appendix A, p.108 of the *Teachers' Manual*.) This booklet is the story of the discovery of each of the major vitamins. It also explains the deficiency diseases that result from the lack of each vitamin.

Read to the class "The Case of the Pine Needle Soup." *The Great Vitamin Mystery*, pp. 18-22. (Available from the office of the Dairy Council.)

74. Discuss:

- o Do children in New York State need vitamin D in their milk more than children in a tropical country?
- o Who might need to consume foods containing vitamin D more than children in New York State?
- o Do you think that living habits or type of clothing one wears could make a difference in one's need for consuming foods containing vitamin D?
- o What are some rich sources of vitamin D?

See pp. 22-25 of *The Great Vitamin Mystery*.

Since exposure to the sun's rays stimulate the body to produce vitamin D, children living in geographic areas where the sun is likely to shine less will need to consume foods containing vitamin D. Alaska would be an example of such an area.

Vitamin D fortified milk is an excellent source of vitamin D as well as calcium and other nutrients.

SUB-TOPIC: Water is Essential

ENABLING OBJECTIVE: *The learner is able to explain the purpose of water in the body.*

LEARNER ACTIVITIES	TEACHER INFORMATION
75. Have a committee of pupils research the answers to these questions and report their findings to the class. - o How much of the human body is water? - o How is water important to cells and tissues of the body? - o What is the function of water in the body? - o Where do we get water? Do foods contain water? 76. Discuss the evidence that foods contain water. Ask the class whether there are ways to prove that foods contain water. - o Compare the amounts of water in various foods.	Most elementary school health text series can be used for this research. Approximately 80 percent of the human body is water. Water is necessary for dissolving chemicals in the body, for digestion of foods, for carrying food and oxygen to the cells, for building protoplasm, and for removal of wastes. Water is necessary for all of life's processes. The pupils have seen evidence that foods contain water. For example, they have seen some foods being squeezed for juice, they may relate the water seen in a pan after spinach is cooked, or the drying out of uncovered bread. This can be done by weighing a food; a spinach or lettuce leaf works well, and then placing the food in a warm place for a few days (or an oven for a shorter period of time). Then weigh the food again. The difference in weight is due to water loss. The water evaporated. To compare the amount of water in different foods, repeat the experiment using equal weights of several moist foods, e.g. fruits and vegetables, and some dry foods; e.g. rice or macaroni. See, also, Appendix C of this guide. An excellent resource is <i>Nutritive Value of Foods</i>, (Home and Garden Bulletin No. 72), United States Department of Agriculture, Washington, D.C.

SUB-TOPIC: Source of Nutrients

ENABLING OBJECTIVE: *The learner is able to explain why food can provide all the nutrients people need.*

LEARNER ACTIVITIES	TEACHER INFORMATION								
77. Have the pupils make a list of a variety of milk products. - o Do you think that boys and girls in Mexico eat the same foods that you do? - o What might they eat? - o Can they eat all the kinds of foods they need without having any of the foods you ate today? 78. From the label on a bottle of vitamin pills, list on the chalkboard the contents (ingredients) of the pills. 79. Discuss the following: - o Can you think of nutrients that we need but are not in the vitamin pills? - o Is there anything in the vitamin pills that we can't get from food? - o If we get enough vitamins from foods we eat, do we need more? - o What happens to the extra vitamins if we already get enough from food and we take a vitamin pill?	Milk provides energy because of the fat and sugar content; it is a rich source of protein; and it has calcium, vitamin D and other minerals and vitamins. A typical menu for Mexican children might be: <table border="0"> <tr> <td>Chicken and/or beans</td><td>Peppers</td></tr> <tr> <td>Tortillas (bread)</td><td>Potatoes</td></tr> <tr> <td>Tomatoes</td><td>Cheese</td></tr> <tr> <td colspan="2">Coffee with plenty of milk.</td></tr> </table> Discuss typical menus for other nations. Vitamin preparations are freely advertised through the media. It is important that the learners begin to analyze these advertisements in terms of scientific facts and their application to good nutrition. Possible responses would be energy-producing nutrients (fats and carbohydrates), and protein. Some vitamin pills contain iron but many do not. The obvious answer is "no," but it might be helpful for greater understanding to discuss the concept that foods may also contain other nutrients that are still unknown. Depending on vitamin pills could result in deficiencies. Excessive quantities of vitamins do us no good. Extra quantities of the water soluble vitamins are excreted in the urine. Fat soluble vitamins are stored.	Chicken and/or beans	Peppers	Tortillas (bread)	Potatoes	Tomatoes	Cheese	Coffee with plenty of milk.	
Chicken and/or beans	Peppers								
Tortillas (bread)	Potatoes								
Tomatoes	Cheese								
Coffee with plenty of milk.									

o Is it possible to take too many vitamin pills?

o When should we take vitamin pills?

80. Debate: If we could get all the nutrients we needed from a pill (which we cannot) do you think that people would stop eating food and start taking pills instead?

- o What impact would a nutrient industry making only pills have on the nation's economy? (Assuming people would take pills instead of eating food)
- o List several occasions or events where food is a central attraction.
- o Is there a pattern of the kinds of foods served on these special occasions?

Excessive amounts of vitamins A and D over a period of time can result in hypervitaminosis.

Vitamin supplements are generally not needed and should be taken only when prescribed by a physician.

Bring into the debate ideas related to foods associated with social events, religion, etc., and the pleasure foods can provide sensually, psychologically and socially.

TOPIC

ENERGY FOODS

SUB-TOPICS

FACTORS AFFECTING ENERGY NEEDS

CARBOHYDRATES AND FATS

TERMINAL OBJECTIVE

To understand the sources and purposes of energy foods.

ENABLING OBJECTIVES

The learner is able to:

1. explain the importance of energy food and the amount required.
2. test and identify foods which contain carbohydrate and which contain fat.

BASIC FACTUAL INFORMATION

Review the discussions on pages 44-45, and 50-58 of the *Teachers' Manual*. The learners should acquire an understanding of the following:

- o *The role of carbohydrates, fats and proteins as energy-producing nutrients.*
- o *How energy is measured.*
- o *The relation of calories to energy production and nutrient density.*
- o *What determines the amount of energy-producing foods one needs.*

TOPIC: Energy Foods

SUB-TOPIC: Factors Affecting Energy Needs

TERMINAL OBJECTIVE: *To understand the sources and purpose of energy foods.*

ENABLING OBJECTIVE: *The learner is able to explain the importance of energy food and the amount required.*

LEARNER ACTIVITIES

81. Discuss:

- o How is food energy measured?
- o What is a calorie?
- o What is a kilocalorie?
- o Does everyone need calories? Explain.
- o Does everyone need the same amount of calories? Explain.
- o What kinds of people need more or less food energy than others?
- o What is food energy used for?
- o Do you think a person that is growing needs more calories or the same amount as a person who is not growing? Explain.

82. From pupils' records of their food intakes, have them identify the differences in the amounts of food eaten by classmates.

83. Discuss reasons for the differences in energy needs of pupils.

TEACHER INFORMATION

(See Appendix B of this guide for supplementary resources)

Food energy is measured in calories. A kilocalorie is a unit of heat. It is defined as the amount of heat required to raise the temperature of one kilogram of water one degree Celsius. A calorie is the amount of heat required to raise the temperature of one gram of water one degree Celsius. Everyone needs foods containing calories since energy is required for all of the body's activities. The more active one is and the more one weighs the more calories that are needed. Therefore, the amount of calories one needs is dependent upon:

- o body size
- o growth rate
- o metabolic rate
- o physical activity

There is a great deal of individual variation in caloric requirements.

Obtain from the office of the Dairy Council the booklet *How Your Body Uses Food*. (See Appendix A, p.108 of the *Teachers' Manual*)

See activity number 81.

84. Make graphs of energy intake of the boys. Of the girls.

- o Are there any differences? Why?
- o Are there differences in body size between boys and girls?

85. Compare and discuss any differences.

- o Is there a difference between the sexes? Discuss.
- o Does body size influence energy intake?
- o Discuss the role of physical activity in energy needs.
- o Is there a difference in the number of calories ingested per unit of body weight?

The amount of food eaten is directly related to energy intake. Planning diets with the class for individuals with different energy needs; such as an athlete, a typist, teenager, older person, will help to clarify this point.

Conclude that all people need the same *kind* of nutrients but their *amounts* will vary with size, activity and growth.

SUB-TOPIC: Carbohydrates and Fats

ENABLING OBJECTIVE: *The learner is able to test and identify foods which contain carbohydrate and which contain fat.*

LEARNER ACTIVITIES	TEACHER INFORMATION
86. Demonstrate that starch (a carbohydrate) will not dissolve in water. Discuss that a cracker is chiefly starch. - o What will happen to the cracker after it is eaten? - o Is the cracker ready to be used by the cells? Why or why not? - o Why is the water and cracker powder cloudy? - o Why is the sugar water clear? - o What happens to the starch water when iodine is added? - o What happens to the sugar water when iodine is added? - o What can we conclude about starch and its ability to dissolve? - o What body action is necessary for changing starch into a soluble sugar? - o What is starch changed into so that our bodies can use it?	Materials needed are a cracker, sugar, iodine, a spoon, two clear glasses. Grind the cracker into a powder and put a teaspoon of the powder into a glass of water. Put a teaspoonful of sugar in another glass of water. Stir each solution thoroughly. The starch particles are big enough to see. They do not dissolve in water. The sugar molecules dissolved in the water; they are too small to be seen. It will turn blue-black. This is a test for the presence of starch. It will remain tan colored indicating that there is no starch present. The class should conclude that starch must be changed into something else before it will dissolve. The action of certain enzymes in the body breaks foods into simple forms so that they can be dissolved in the body fluids and absorbed from the gastrointestinal system. This is the process of digestion. <i>Note: Tincture of iodine is poisonous if taken internally. It also stains clothing, and if it is old, it will burn the skin.</i>
87. Have the pupils discover that starch is changed to sugar in the mouth. Have each pupil chew a part of a cracker but do not swallow it. Hold it in the mouth for several minutes. - o What do you notice about the taste? - o What do you think the starch changed to? - o What made this happen?	The cracker will become sweet. The enzyme ptyalin that is present in saliva changes starch to dextrin, a sugar.

88. Demonstrate that starch is broken down by the enzymes present in saliva.

- o What happens in the three test tubes when iodine is added?
- o What do you think will happen if the test tubes are allowed to stand for several hours?
- o Why did the blue color disappear in the test tube containing the starch and saliva?
- o Is there any starch in the test tube now? Why not?
- o What has the starch been changed to?

89. Have the pupils discover that starch is digested or changed to sugar in plants. Make slides from a thin smear of ripe and unripe bananas. Stain each slide with iodine. Cover with a cover glass. Compare the slides.

- o What do you see?
- o Why are the colors of the slides containing the unripe banana darker than those containing the ripe banana?

90. Conduct tests for the presence of starch in a variety of foods. Use foods such as potato, apple, bread, spaghetti, corn, beans, squash. Have pupils place a drop or two of iodine on each piece of food.

- o What are the results?
- o Which foods show a purple-black color?

Materials needed are 3 test tubes, test tube holder, iodine, cornstarch or flour, two small glasses or cups.

Make a starch solution by adding a teaspoon of flour or cornstarch to about a half cup of water. Collect some saliva in another cup. To one test tube, add about 2 tablespoons of starch solution. To a second test tube, add 2 tablespoons of starch solution and 2 tablespoons of saliva. To the third test tube, add only 2 tablespoons of saliva. To all three test tubes add two or three drops of iodine. The two test tubes containing starch will turn blue-black. After letting the test tubes stand for several hours, the one containing the starch and saliva will begin to clear up. That is, the blue color will disappear. This happens because the starch is changed to sugar.

Materials needed are microscopes or microprojector, slides, cover glasses, iodine, knife, ripe banana and an unripe banana.

The slides containing the unripe banana will show much more starch present.

Materials needed are iodine, eyedropper, and foods.

Caution pupils about iodine being poisonous. Show them the label. Discuss the importance of reading labels.

91. Conduct tests for fat. Have the pupils chop or mash the food sample and rub a small amount on a piece of the brown paper bag. Heat the paper with the food on it over a light bulb.

- o What are the results with each food sample tested?
- o What does the grease stain look like?

Materials needed are lighted light bulb, brown paper bag, foods to be tested, knife and fork. Foods to be tested should include cheese, bacon, mayonnaise, egg yolk, egg white, luncheon meat, and peanut butter.

TOPIC

FOODS FOR GROWTH

SUB-TOPIC

FACTORS AFFECTING GROWTH

PROTEIN FOODS

TERMINAL OBJECTIVE

To understand that many factors affect one's growth rate and pattern.

ENABLING OBJECTIVES

The learner is able to:

1. show the relationship of heredity and nutrition to growth.
2. describe the importance of protein foods for growth and maintenance of health.

BASIC FACTUAL INFORMATION

Review the discussions on pages 44, 49, 50-52 of the *Teachers' Manual*. The learners should acquire an understanding of the following:

- o *The role of heredity and nutrition in growth.*
- o *The role of high quality sources of protein.*
- o *How cells reproduce to affect one's growth.*
- o *The use and limitations of height and weight tables.*

TOPIC: Foods for Growth

SUB-TOPIC: Factors Affecting Growth

TERMINAL OBJECTIVE: *To understand that many factors affect one's growth rate and pattern.*

ENABLING OBJECTIVE: *The learner is able to show the relationship of heredity and nutrition to growth.*

LEARNER ACTIVITIES

92. Discuss:

- o What makes us grow?
- o Does anything else make us grow?
- o If we continued to eat good food all our lives would we keep growing indefinitely?
- o Do people ever stop growing in height and weight? Why?
- o What in relation to growth is inherited?
- o Can inherited traits be changed?
- o Is one's size inherited?
- o What makes a dandelion grow small, while an oak tree grows large?
- o Are your parents taller than your grandparents?
- o Do you think that you will be taller than your parents?
- o Are all of the pupils in the class the same size?
- o Are those who are the same height the same in other respects?
- o What can be concluded from our measurements of classmates?

93. Ask pupils how we might demonstrate that individual differences exist from the very beginning of life. Have each pupil obtain from their mothers the following information:

- o birth weight
- o birth height (length)
- o age at which the first tooth erupted
- o age walking began

TEACHER INFORMATION

One of the common answers will probably be food. Food is, of course, one of the right answers but not the whole answer.

The basic concept that the pupils should develop is that there is a "plan" which tells our bodies when to grow, how much to grow, and when to stop growing. We must have food in order to follow the plan. The plan is controlled and directed by heredity.

Improved nutrition over the decades has made it possible for an individual's inherited potentials to become more fully expressed.

Show that we are all different in size and proportion. Have each pupil measure four classmates for height, sitting height, length of arms and length of hands.

In a class in which this information is not likely to be available, the activity could be carried out using only birth weights since most mothers will remember this.

It's important to emphasize that the individual differences that will be obvious are normal. Differences can be compared to flowers. Tulips bloom in the early spring while chrysanthemums bloom in the fall, but all flowers are beautiful.

94. List on the chalkboard the heights and weights of the pupils and the differences in the timing of developmental signs.

95. Find the average height and weight of the class.

- o Was anyone exactly average?
- o How many pupils are exactly average in height? In weight?
- o If we were all average, would we all be the same? Discuss.
- o Do you think you would like it if everyone were exactly the same size? Explain.

96. Have the pupils obtain their height and weight data since birth. Each pupil can plot his or her height and weight on a chart or by using the Dairy Council form.

- o Are there some years in which you grew more than others? Discuss why.
- o Were there any years in which you grew hardly at all? Discuss why.
- o Do you think there will be years when you will grow fast? Slow? Not at all? Discuss why.

97. Find the average height of the girls in the class.

This might best be done by using a table format with the pupils' characteristics listed horizontally and each pupil listed vertically.

The class may confuse average with normal. It is important that they realize that they can be normal and healthy and still be far from average.

In case of a class that includes children known to be sensitive about their weight, use data from another class or from hypothetical data.

Obtain copies of "My Growth Record" from the office of the Dairy Council. (See Appendix A, p.108 of the *Teachers' Manual*) If a pupil does not have data from birth, information can be obtained from the school nurse since the time the child entered school.

Both the total and average will probably be greater for the girls. Some of the girls may have already begun the adolescent growth spurt. They may need to be reassured that others (including the boys) will catch up later. Conclude that girls are only temporarily taller than boys. Boys will grow more when they are teenage and usually be taller as adults.

98. Find the average height of the boys in the class.

99. Compare the average heights of the boys and girls in the class. Compare the average heights for men and women.

Make a class-size graph of the height of boys and girls in the class. A typical graph may look like the one below.



100. Have the pupils bring to class baby pictures of themselves, pictures at preschool age and pictures taken recently. A bulletin board display of the children's growth can be made with the pictures. Have the pupils note that many, perhaps most of the babies look round and chubby.

- o Are the chubby babies fat? Discuss.
- o Were you thinner as a preschooler? Why?

101. With the aid of the pupils, list on the chalkboard all the parts of the body that contribute to weight.

- o Is it true that some of us have bigger bones than others? Explain.
- o Do some people have bigger muscles than others?
- o Is body weight caused only by fat?

102. Invite the school physician or a pediatrician to class to talk about growth. They may bring and demonstrate the instruments used for measuring height and weight, and show the kind of growth chart upon which they record measurements.

Most children thin some during the preschool years. Some, however, stay plump. Hereditary growth patterns, as well as food habits, affect the growth progress and general characteristics of the individual child.

The list of parts of the body can include bones, muscles, skin, blood, fat, visceral organs, etc. The pupils should conclude that body weight does not depend only upon the fat content, but rather all parts of the body contribute to its total weight. Also, that we can't change the kind of bones or other parts we have. The bones actually determine our basic body size.

SUB-TOPIC: Protein Foods

ENABLING OBJECTIVE: *The learner is able to describe the importance of protein foods for growth and maintenance of health.*

LEARNER ACTIVITIES	TEACHER INFORMATION
103. List on the chalkboard the foods that two or three students ate yesterday. Identify the rich protein sources in the foods they ate. - o What other foods are rich in protein? - o What areas or countries use these alternate protein sources? - o Why are protein foods essential? - o Why does a person who is growing need more protein than a person who is not? - o Does a growing person need more of other nutrients than one who is not growing? 104. Discuss the role of protein in growth. List on the chalkboard foods that the pupils think contain protein, fat, carbohydrate. 105. Conduct tests for these three substances on a variety of foods the pupils have brought to class. As the tests are made, revise the list of foods accordingly. 106. To conduct a test for protein, burn a small feather. - o How does the burning feather smell? - o Why burn a feather? - o What is a feather made of? - o Which foods contain protein? - o Which ones were listed on the chalkboard? Should others be added?	It is important for the pupils to understand that certain cells need particular nutrients. For example, bones and teeth must have calcium and phosphorus while all cells need energy and protein for growth and function. (See page 44 of the <i>Teachers' Manual</i>.) A three column table may be helpful. After conducting the tests, it may be found that some foods should be listed in more than one column. Pupils will develop the concept that many foods contain these substances. Materials needed to conduct the tests are candle or bunsen burner, matches, feather, foods to be tested. The resulting odor from the burning feather is characteristic of protein. Use this same test to determine the presence of protein in foods. If the odor of burning feathers results from burning a food, protein is present. Foods to be tested for protein are cheese, meat, dry skim milk powder, beans, egg white, peanuts, cold meats, butter, mayonnaise, sugar...

APPENDIX A

Books With Food as the Primary/Secondary Subject*

Fiction stories are a rewarding way to introduce health concepts at many age levels. All the stories suggested in this listing are fun and exciting for language skill development but....they were particularly chosen to be used as *springboards for exploration of nutrition/health education topics!*

JUNIOR FICTION

Books With Food As Primary Subject

Babbitt, Natalie. *The Search for Delicious*. New York: Farrar, Straus, and Giroux, 1969, 3-5.

Gaylen, the King's messenger, has been sent by horse to poll the kingdom in order to resolve a disagreement at the royal castle. The poll is to find which food should stand for the word "delicious" in the new dictionary.

Bishop, Claire Hutchet. *Pancakes - Paris*. New York: The Viking Press, 1947, 3-4.

Charles was given a box of American pancake mix by some American soldiers, and he was determined to keep it as a surprise for his sister and hard-working mother on the first day of Mardi Gras. Their meals, ever since the war began, usually consisted of soup and dry bread; pancakes would be a real treat.

Dahl, Ronald. *Charlie and the Chocolate Factory*. New York: Alfred A. Knopf, 1964, 4-5.

Only five children in the world were going to be allowed into Willy Wonka's chocolate factory, and Charlie Budket was one of them. There are many adventures in this factory and all of them have to do with one kind of candy or another.

*This annotated bibliography was originally compiled by Ellen Harris, Children's Librarian, John Inverso, Director of Health and Drug Education both of the St. Lawrence-Lewis Counties BOCES, and Judith Needham formerly Associate in School Health Education, New York State Education Department.

De Angeli, Marguerite. *Turkey for Christmas*. Philadelphia: The Westminster Press, 1965, 3-4.

One Christmas 15-year-old Martha was in the hospital and required a lot of costly care. Consequently there was not enough money for both turkey dinner and presents. Although the children chose the turkey dinner, the surprise return of Martha made the day.

DeJong, Meindert. *Nobody Plays with a Cabbage*. New York: Harper and Row, 1962, 3.

Jim's vegetable garden was really important to him, but the rest of his family would not leave it alone. Finally there is only one plant left, a cabbage, and Jim protects it with his life.

Fritz, Jean. *George Washington's Breakfast*. New York: Coward-McCann, Inc., 1969, 3.

George W. Allen was named for George Washington and his birthday was February 22nd. He was always discovering new things they had in common until one day he realized he did not even know what Washington ate for breakfast. He set out to find the answer and did.

Hildick, E. W. *The Doughnut Dropout*. Garden City, New York: Doubleday & Co., Inc., 1972, 4-6.

Adam Trenchard was from a family of champion eaters: his father for deep dish apple pie, his Uncle Victor for pumpkin pie, Uncle Henry for pizza, Greatuncle Charles for hot dogs, and his grandfather who is encouraging him to become the doughnut eating champion of the world. From beginning to end the main concern of this family is food and increasing their capacities to eat more.

Hodges, Margaret. *What's for Lunch, Charley?* New York: The Dial Press, 1961, 3. Also available in paperback from Inquiry Department, Scholastic Magazine, 904 Sylvan Avenue, Englewood Cliffs, New Jersey 07632.

Charley had trouble remembering things in the morning and on this particular day he forgot his lunch of sandwich, milk, fruit and cookie. Charley decided to go to the King Charles Hotel, but the lunch was too big and too expensive, so he never forgot his lunch again.

Kerr, M. E. *Dinky Hocker Shoots Smack*. New York: Harper and Row, Publishers, 1972, 5-6.

Dinky's mother is so involved in drug addict rehabilitation that she overlooks the fact that Dinky has her own problems; one of them is eating constantly. This is a realistic book which probes food and the eating patterns of a city family.

Krantz, Hazel. *100 Pounds of Popcorn*. New York: Vanguard Press, Inc., 1961, 3-4.

The Taylor's found a 100-pound bag of popcorn on the road and were asked to keep it in order to prevent a hazard. They were forced to start a business selling popcorn but this turns into a disaster.

Krungskold, Joseph. *Onion John*. New York: Thomas Y. Crowell, 1959, 5-6.

Onion John lived up on the hill and was considered strange to some people. He got his name from eating onions raw, just as everyone else would eat apples. Amidst plans of transforming Onion John, a boy realizes that Onion John has a lot to offer just the way he is.

Lexau, Joan M. *Striped Ice Cream*. New York: J. B. Lippincott Company, 1968, 4-5.

Becky wanted chicken-spaghetti and striped ice cream again this year for her birthday, but money was tight and weiners and beans were the menu. Food was a big concern in her home but her family did manage to surprise Becky with more than striped ice cream.

McGovern. *Stone Soup*. New Jersey: Inquiry Department, Scholastic Magazines, 904 Sylvan Avenue, Englewood Cliffs, New Jersey 07632.

A clever young man makes soup from a store with the aid of a greedy old lady. Excellent for use as a flannel board story.

Milne, A. A. *Winnie-the-Pooh*. New York: E. P. Dutton & Co., Inc., 1926, 3-4.

Pooh Bear could not resist honey and in this story he has many adventures and misadventures because of his craving. Pooh's other friends are here as well and make a lovable tale of friendship.

Orgel, Doris. *Next Door to Xanadu*. New York: Harper & Row, Publishers, 1969, 5-6.

Besides wanting her very own friend, Patricia wished she could be thin; but food, especially chocolate egg creams, just could not be passed up. Both of her problems are solved in the course of the book and she becomes a happier person.

Parker, Richard. *M for Mischief*. New York: Hawthorne Books, Inc., 1966, 4-5.

Moving into a new house can be exciting, especially when it involves a summer house out back which contains an old stove and magic cookbook. When hard-boiled eggs make people invisible and cookies turn others into domestic animals, a solution must be reached, but not without much hilarity.

Perl, Lila. *Me and Fat Glenda*. New York: The Seabury Press, 1972, 5-6.

Sara Mayberry's first friend after her move to Havenhurst, New York, was Glenda Waite, better known as Fat Glenda. Glenda's obsession with food has the two creating alphabet-burgers, a different kind of burger for A-Z, with the recipes included. This story is comical but it ends with Glenda learning something about food and dieting.

Sharfman, Amalie. *Papa's Secret Chocolate Dessert*. New York: Lothrop, Lee. & Shepard Company, 1972, 4.

Jean-Pierre's one wish is to be a great chef like his father, but he is never given the chance until one day when his father gets sick. An important guest is expected for lunch and Jean-Pierre's patient watching pays off when his chocolate dessert is just as good as his father's.

Warner, Gertrude Chandler. *The Boxcar Children*. Chicago: Albert Whitman & Company, 1942, 3-4.

A primary concern of four parentless children in this well-loved classic, is what they will eat. From the very beginning they must search or work for their next meal. By the end of the book food is no longer a worry.

Winslow, Marjorie. *Mud Pies and Other Recipes*. New York: MacMillan Company, 1961, 3.

This outdoor cookbook contains many creative recipes: Tossed Leaves, Bark Sandwiches, Mud Puddle Soup and Pine Needle Upside Down Cake. It is divided into various useful sections: Appetizers, Soups, Salads and Sandwiches, Main Dishes, Pastries and Desserts, Beverages and Suggested Menus.

Books With Food As Secondary Subject

Angelo, Valenti. *The Candy Basket*. New York: The Viking Press, 1960, 3.

Little Mouse lived in the bakery of a hotel and his curiosity got him into many close shaves. While tasting the goodies in a candy basket he was carried off to be served, but fortunately the party to be served was the Friends of Animals Club, and he was able to escape.

Annett, Cora. *When the Porcupine Moved In*. New York: Franklin Watts, Inc., 1971, 3.

Rabbit was happy and comfortable until Porcupine moved in and changed his life style; especially when Rabbit had to eat beans and brown bread instead of lettuce and carrots and cucumbers and radishes and cabbage. But Rabbit finds a way to trick Porcupine and it works successfully.

Blume, Judy. *Otherwise Known as Sheila the Great*. New York: E. P. Dutton & Co., Inc., 1972, 4-6.

One of Sheila's friends during her summer vacation in Tarrytown is sweet Sondra, Jane's twin sister. Sondra is fat and her summer experiences teach her not to reach for that third piece of pizza. This comical story is very true to life but Sondra is only a secondary character.

Campbell, Hope and Mary Anderson. *There's a Pizza Back in Cleveland*. New York: Four Winds Press, 1972, 6.

Two 15-year-old girlfriends part for the summer and make an oath which ends with a grand prize to be given to the winner; the one who meets and keeps a man over the age of eighteen. The prize is a pizza which is disputed over between letters and one never does find out who gets that pizza.

Carden, Priscilla. *The Vanilla Village*. Eau Claire, Wisconsin: E. M. Hale and Company, 1952, 3.

Chombo lived in a Mexican village called Vanilla Village where vanilla was raised to be sent to other countries. One night Chombo helped to solve the mystery of the bandits who held up villagers and stole their vanilla on its way to sea.

Carroll, Lewis. *Alice's Adventures in Wonderland*. New York: St. Martin's Press, 1947, 4-6.

One of Alice's adventures after she falls down the rabbit hole is the mad tea party. Afternoon tea with its usual treats is traditional of English people and here is an unusual way of learning about it.

Clymer, Eleanor. *Me and the Eggman*. New York: E. P. Dutton & Co., Inc., 1972, 4.

Donald was a city boy and did not know much about the country until he hid inside the eggman's truck and ended up spending the whole summer on the farm. He learned to love milking cows, collecting the eggs and picking vegetables from the garden.

Corbett, Scott. *The Lemonade Trick*. Boston: Little, Brown & Company, 1960, 3-4.

Kerby helped an old lady and was rewarded with a chemistry set which turns out to be magic. With the help of some lemonade and a few drops of the magic chemical, many people were temporarily changed.

Dahl, Ronald. *James and the Giant Peach*. New York: Alfred A. Knopf, 1961, 3-4.

Forced to live with two mean aunts, James was almost dying of boredom until he met the man who brought magic into his life. The giant peach that grows on his aunts' lawn is the means of transportation as he travels half way around the world, and becomes free of his past life.

Farley, Carol. *The Bunch of McKellahan Street*. New York: Franklin Watts, Inc., 1971, 5-6.

Delores, one of the "bunch" is fat and very much concerned with her looks. Her mother is one of those who believes that children must eat even their bread crusts in light of "the starving children in Europe." When one of the bunch dies at the end, Delores' comment is, "he's the only one who never called me 'fat'."

Friedman, Frieda. *A Sundae with Judy*. New York: William Morrow and Company, 1949, 4.

Judy Marshall loved helping her father in his candy store because she loved making sundaes for herself. Her sister accused her of being fat but after doing a good deed she was described in the newspaper as being "a plump, pretty eleven year old."

Hunt, Irene. *Trail of Apple Blossoms*. Chicago: Follett Publishing Company, 1967, 4-5.

This fictionalized account of the life of John Chapman, better known as Johnny Appleseed, is beautiful. The text and illustrations have portrayed a man who not only planted apple seeds across the country but also seeds of love and justice and hope.

McCloskey, Robert. *Homer Price*. New York: The Viking Press, 1943, 4.

Mechanically-minded Homer is always up to some new adventure or invention. This humorous classic is known for the day Homer made enough doughnuts to feed the world while looking after Uncle Ulysses' shop.

Miles, Betty. *Feast on Sullivan Street*. New York: Alfred A. Knopf, 1963, 3.

Every year in New York City the Italians had a Festa of Saint Anthony, and the whole street smelled of sausages and onions, pizza, clams and Italian doughnuts. Michael was eight and ready to help but his parents thought he was too young. He surprises, even himself, when he makes two dollars helping to sell clams.

Offit, Sidney. *The Boy Who Made a Million*. New York: St. Martin's Press, 1968, 5-6.

Benjamin Burke's dad has a grocery store which is losing business because of a new A & P and a gourmet shop in the area. Benjamin, with his mathematical mind, takes over the shop and changes it into a wholesale warehouse and management center for a chain of cooperative groceries, and makes a million. Many kinds of food are mentioned here in relation to the business.

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Rodgers, Mary. *The Rotten Book*. New York: Harper and Row, Publishers, 1969, 3.

While eating his sunny-side up egg one morning, Simon imagines all the most rotten things he can think of doing in one day. At the end he pictures himself in prison with only bread and water; he quickly finishes his morning egg.

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APPENDIX B

Supplementary Resources

Nutrition Comes Alive

This is a set of 7 leveled nutrition education activity packets for each of grades K through 6. There is also an eighth packet that provides ways in which the School Food Services personnel can become involved in the school's nutrition education program. The program is completely new, offering unique approaches to learning about nutrition which actively involves the pupils in experiences with food and nutrition. Each resource packet capitalizes on learning experiences through other disciplines, such as language arts, math, social studies, science, art and music, as well as health education.

A teachers' guide accompanies each resource packet and provides the teacher with a rationale, essential nutrition information, learning objectives, suggestions for implementing the learning experiences, and methods for evaluating pupils' comprehension. A brief description of each resource packet appropriate for grades 4-6 follows:

Level 5: "On the Move"

The major nutrition concept for this resource packet is *energy balance*. Energy is needed by all living things in order to maintain life. Balancing energy intake (food) with energy output (exercise) is important in understanding weight maintenance and health.

The resource packet contains:

- o an energy workbook
- o calorie/history story problems
- o science experiments

*For further information about these resources and how to obtain them for use with your pupils, contact the Bureau of School Health Education and Services, The State Education Department, Albany, New York, 12234.

Level 6: "The Nutrient Connection"

The major nutrition concept for this resource packet is *nutrients for the body*. The nutrients in foods we eat supply the body with the essentials for health.

A class of "mad" scientists have fun learning about the nutrients in foods and how they affect body functions. The resource packet includes:

- o analyzing nutrients in foods
- o planning nutritious meals
- o fascinating experiments

Level 7: "A Case of Waste"

The major nutrition concept in this resource packet is *food waste*. Food waste is abundant in the United States and is an expensive loss of dollars, energy, and nutrients. As "ecologists," the pupils will explore the present state of food waste and its implications for the world's food and energy supply. The resource packet contains:

- o a slide tape on food waste
- o an accompanying workbook
- o "plate waste" studies in school

APPENDIX C

NUTRITIVE VALUE OF SOME FOODS

Food	Serv- ing size	Water	Food ener- gy	Pro- tein	Fat	Carbo- hydra- te	Cal- cium	Iron	Vit- amin A	Thia- min	Ribo- flav- in	Nia- cin	Ascor- bic acid
		%	Kcal	gm	gm	gm	mg	mg	IU	mg	mg	mg	mg
Milk													
whole	1 cup	87	160	9	9	12	288	.1	350	.07	.41	.2	2
skim	1 cup	90	90	9	trace	12	296	.1	10	.09	.44	.2	2
cream (heavy)	1 cup	57	840	5	90	7	179	.1	3,670	.05	.26	.1	2
Cheese													
cottage	1 cup	78	260	33	10	7	230	.7	420	.07	.61	.2	0
American	1 oz.	40	105	7	9	1	198	.3	350	.01	.12	trace	0
cream	1 cu. in.	51	60	1	6	trace	10	trace	250	trace	.04	trace	0
Egg	1 lg.	74	80	6	6	trace	27	1.1	590	.05	.15	trace	0
Hamburger (regular)	3 oz.	54	245	21	17	0	10	3	20	.08	.2	5	0
Sirloin (broiled)	3 oz.	44	330	20	27	0	9	2.5	50	.05	.16	4	0
Corned beef	3 oz.	59	185	22	10	0	17	3.7	20	.01	.2	2.9	0
Beef & veg. stew	1 cup	82	210	15	10	15	28	2.8	2,310	.13	.17	4.4	15
Chicken breast	3.3 oz.	58	155	25	3	1	9	1.3	70	.04	.17	11.2	0
Chicken drumstick	2.1 oz.	55	90	12	4	trace	6	.9	50	.03	.15	2.7	0
Chili w/beans	1 cup	72	335	19	15	30	80	4.2	150	.08	.18	3.2	0
Liver, beef	2 oz.	57	130	15	6	3	6	5.0	30,280	.15	2.4	9.4	15
Ham, lean	2 oz.	54	245	18	19	0	8	2.2	0	.40	.16	3.1	0
Sausage, pork	2 link	35	125	5	11	trace	2	.6	0	.21	.09	1.0	0
Clams	3 oz.	82	65	11	1	2	59	5.2	90	.08	.15	1.1	8
Fish sticks, bread-	3 oz.	66	140	17	5	5	34	1.0	0	.03	.06	2.7	2
Oysters, raw	1 cup	85	160	20	4	8	226	13.2	740	.33	.43	6.0	0
Beans, lima (dry)	1 cup	64	260	16	1	49	55	5.9	0	.25	.11	1.3	0
Peanut butter	1 tbs	2	95	4	8	3	9	.3	0	.02	.02	2.4	0

APPENDIX C (Continued)

	Serv- ing size	Water	Food ener- gy	Pro- tein	Fat	Carbo- hyd- rate	Cal- cium	Iron	Vit- amin A	Thia- min	Ribo- flav- in	Nia- cin	Ascor- bic acid
		%	Kcal	gm	gm	gm	mg	mg	IU	mg	mg	mg	mg
Asparagus	4 spr	94	10	1	trace	2	13	.4	540	.10	.11	.8	16
Green beans	1 cup	92	30	2	trace	10	81	2.9	690	.07	.10	.7	10
Beets, whole	2 bts	91	30	1	trace	7	14	.5	20	.03	.04	.3	6
Broccoli	1 stlk	91	45	6	1	8	158	1.4	4,500	.16	.36	1.4	162
Brussels sprouts	1 cup	88	55	7	1	10	50	1.7	810	.12	.22	1.2	135
Cabbage, raw	1 cup	92	15	1	trace	4	34	.3	90	.04	.04	.2	33
Carrots, raw	1 cat	88	20	1	trace	5	18	.4	5,500	.03	.03	.3	4
Celery, raw	1 stlk	94	5	trace	trace	2	16	.1	100	.01	.01	.1	4
Corn, sweet	1 ear	74	70	3	1	16	2	.5	310	.09	.09	1.0	7
Lettuce, raw	1 hd	95	30	3	trace	6	77	4.4	2,130	.14	.13	.6	18
Peas, green	1 cup	82	115	9	1	19	37	2.9	860	.44	.17	3.7	33
Potatoes, baked	1 md.	75	90	3	trace	21	9	.7	trace	.10	.04	1.7	20
Potatoes, fr. frd.	10 pcs	45	155	2	7	20	9	.7	trace	.07	.04	1.8	12
Spinach	1 cup	92	40	5	1	6	167	4	14,580	.13	.25	1.0	50
Tomatoes, raw	1 med	94	40	2	trace	9	24	.9	1,640	.11	.07	1.3	42
Apple, raw	1 app	85	70	trace	trace	18	8	.4	50	.04	.02	.1	3
Avocado	1 av.	74	370	5	37	13	22	1.3	630	.24	.43	3.5	30
Banana, med.	1	76	100	1	trace	26	10	.8	230	.06	.07	.8	12
Fruit cocktail	1 cup	80	195	1	trace	50	23	1.0	360	.05	.03	1.3	5
Grapefruit, raw	med.	89	45	1	trace	12	19	0.5	10	.05	.02	.2	44
Grapes, raw	1 cup	82	65	1	1	15	15	.4	100	.05	.03	.2	3
Lemon, raw	med.	90	20	1	trace	6	19	.4	10	.03	.01	.1	39
Orange, raw	med.	86	65	1	trace	16	54	.5	260	.13	.05	.5	66
Peach, raw	med.	89	35	1	trace	10	9	.5	1,320	.02	.05	1	7
Pear, raw	med.	83	100	1	1	25	13	.5	30	.04	.07	.2	7
Raisins, seedless	1½ tbs	18	40	trace	trace	11	9	.5	trace	.02	.01	.1	trace
Watermelon, raw	wedge	93	115	2	1	27	30	2.1	2,510	.13	.13	.7	30
Bagel, egg	1	32	165	6	2	28	9	1.2	30	.14	.1	1.2	0
Biscuits	1	28	90	2	3	15	19	.6	trace	.08	.07	.6	trace
Bran flakes 40%	1 cup	3	105	4	1	28	25	12.3	0	.14	.06	2.2	0
Cracked wheat brd.	1 slc.	35	65	2	1	13	22	.3	trace	.03	.02	.3	trace
French bread	1 loaf	31	1,315	41	14	251	195	10	trace	1.27	1	11.3	trace
Italian bread	1 loaf	32	1,250	41	4	256	77	10	0	1.32	.91	11.8	0

APPENDIX C (Continued)

	Serv- ing size	Water	Food ener- gy	Pro- tein	Fat	Carbo- hy- drate	Cal- cium	Iron	Vit- amin A	Thia- min	Ribo- flav- in	Nia- cin	Ascor- bic acid
		%	Kcal	gm	gm	gm	mg	mg	IU	mg	mg	mg	mg
Rye bread	1 slc	36	60	2	trace	13	19	.4	0	.05	.02	.4	0
White bread	1 slc	36	70	2	1	13	21	.6	trace	.06	.05	.6	trace
Whole wheat bread	1 slc	36	65	3	1	14	24	.8	trace	.09	.03	.8	trace
Macaroni, cooked	1 cup	64	190	6	1	39	14	1.4	0	.23	.14	1.8	0
Noodles, egg, cooked	1 cup	70	200	7	2	37	16	1.4	110	.22	.13	1.9	0
Oatmeal, cooked	1 cup	87	130	5	2	23	22	1.4	0	.19	.05	.2	0
Pizza, cheese	1 sect	45	185	7	6	27	107	.7	290	.04	.12	.7	4
Rice, cooked	1 cup	73	225	4	trace	50	21	1.8	0	.23	.02	2.1	0
Rolls, hamburger	1 roll	31	120	3	2	21	30	.8	trace	.11	.07	.9	trace
Spaghetti, cooked	1 cup	72	155	5	1	32	11	1.3	0	.20	.11	1.5	0
Butter	1 tbs	16	100	trace	12	trace	3	0	470	0	0	0	0
Margarine	1 tbs	16	100	trace	12	trace	3	0	470	0	0	0	0
Beer	12 oz	92	150	1	0	14	18	trace	0	.01	.11	2.2	0
Gin, vodka, rum, whiskey (80 proof)	1½ oz	67	100	0	0	trace	0	0	0	0	0	0	0
Cola	12 oz	90	145	0	0	45	0	0	0	0	0	0	0
Chocolate (semi-sweet)	1 cup	1	860	7	61	97	51	4.4	30	.02	.14	.9	0

Source of data: *Nutritive Value of Foods*. Home and Garden Bulletin No. 72, United States Department of Agriculture.